Biochar: A Product of the Biobased Economy with Wide Potential use in the Management of Contaminated Areas

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Biochar has gained significant focus over recent years because of its many promising beneficial applications. In the context of a global conversion to the bio-based economy, biochar will become more widely available as a side product of the conversion of biomass into basic chemicals, and production of green energy. Current economic constraints on more wide scale use involving large volumes may become less limiting for considering the use of biochar on soil, i.e., for the management of contaminated areas, or for controlling the transfer of potentially hazardous elements to the food chain. Vegetable crop production is confronted with increasingly stringent standards for trace metal contents in the produced vegetable aimed to guarantee food safety and protect the population from the potential long term hazardous effect of elements. Depending on soil properties, even soils with baseline metal concentrations my still entail an appreciable risk to exceed these standards in the crop. Another potential application of biochar is in the management of areas that have been contaminated over extended areas, for example through long term application of metal containing agrochemicals, or through emissions from smelter activities. These are cases where conventional engineering based soil remediation is not practically and economically feasible. Such areas may only be kept under beneficial use provided that the management of these lands accounts for the contamination present. Properly managed, these areas may still be usable for agriculture to produce non-food and even food crops. Nature development of such areas may contribute to increasing biodiversity, improved watershed management and other ecosystem functions. Applied into the soil, biochar provides many benefits similar to soil organic matter, with longer lasting effects because of its stability. It contributes cation exchange capacity and sorption sites that tend to decrease concentrations of potentially toxic metals in the soil solution. In addition, many biochars are alkaline and contribute a liming effect. Biochar thus can effectuate a decrease in metal bioavailability that may last for an extended period of time, typically decades and more. Use as a soil amendment may provide a safe beneficial use of these chars, contributing to restitution of organic carbon to soils and carbon sequestration.

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